

## **Modeling the response of imperiled freshwater mussels to anthropogenically induced changes in water temperature, habitat, and flow in streams of the southeastern and central United States**

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**Summary:** Freshwater mussels are in serious global decline and urgently need protection and conservation. Declines in the abundance and diversity of North American mussels have been attributed to a wide array of human activities that cause pollution, water-quality degradation, and habitat destruction, and recent findings suggest that many species are living close to their upper thermal tolerances. This project will combine the expertise and resources of multiple scientists, agencies, and universities and build on past findings. The primary objective is to use newly developed mussel vulnerability and risk threshold data in downscaled watershed and instream regional models to allow federal and state natural resource managers to forecast species responses to climate change over the next 30-50 years and to develop adaptation strategies to mitigate the adverse effects. Secondary objectives will be to refine these models and to generate new models with empirical data produced from integrated laboratory and field studies of mussel temperature sensitivities in water and sediment, and instream flow and habitat assessments for mussels. Each objective specifically addresses priority needs of federal and state management partners. The research combines laboratory, field, and modeling approaches utilizing existing data and gathering new empirical information; spans broad spatial, temporal, and organizational scales; supports the higher education of future natural resource professionals; and contributes to the science and conservation of the most imperiled fauna in the world as affected by climate change.

